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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/853,642 | 05/14/2001 | Jang-Kun Song | 06192.0164.AA | 6479 |
| 7590 10/20/2003 MCGUIRE & WOODS LLP 1750 TYSONS BOULEVARD SUITE 1800 MCLEAN, VA 22102 | | | EXAMINER SCHECHTER, ANDREW M | |
| | | | ART UNIT 2871 | PAPER NUMBER |

DATE MAILED: 10/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/853,642

Applicant(s)

SONG ET AL.

Examiner

Andrew Schechter

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 7-13 and 20-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,6,15-17 and 19 is/are rejected.
- 7) ☒ Claim(s) 4,14 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 4 August 2003 have been fully considered but they are not persuasive.

The applicant argues [p. 9] that the "display electrodes 14" are wider than the black mask units. However, in this context the display electrodes in *Yanagisawa's* passive matrix display are not analogous to the gate and data lines of *Han's* active matrix display. Comparing the widths of the black matrix and the display electrodes is completely irrelevant, so this argument is not persuasive.

The applicant argues [p. 9-10] that neither *Han* nor *Yanagisawa* taken by itself discloses black matrix, gate lines, and data lines on the same substrate. The examiner notes that it is the combination of *Han* and *Yanagisawa* which is used in the rejections under 35 U.S.C. 103, so this argument that neither reference shows all the recited features is not persuasive.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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3. Claims 1-3, 5, and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Han et al.*, U.S. Patent No. 5,926,235 in view of *Yanagisawa*, U.S. Patent No. 5,128,786, and further in view of *Ishiguro*, U.S. Patent No. 5,956,103.

Han discloses [see Fig. 6, for instance] a liquid crystal display comprising a first insulating substrate [110], a gate line assembly [107] with gate lines and gate electrodes [see Fig. 4, 107 and 117], a gate insulating pattern [109], a semiconductor pattern [111], an ohmic contact layer [112], a data line assembly with source and drain electrodes [105 and 106] and data lines [115], and a protective layer [113a] covering the data line and gate line assemblies while exposing the gate insulating pattern, the semiconductor pattern, and the substrate below the gate insulating pattern (where the insulating layer is located in the claimed invention) at the pixel areas [compare Figs 6a and 6b with the application's Fig. 2].

Han does not disclose a black matrix formed on the substrate, mesh-shaped with opening portions at pixel areas, and an insulating layer on and covering the black matrix and substrate. *Yanagisawa* does disclose a black matrix [16] formed on an analogous substrate for an analogous device, mesh-shaped with openings at the pixel areas, and an insulating layer [17] on and covering the black matrix and substrate. The rest of the structure (electrodes, alignment layer, etc.) is then layered on top of the insulating layer. Note that although the figures in *Yanagisawa* depict a passive matrix LCD with simple lines of electrodes, *Yanagisawa* explicitly says that its invention (the black matrix in discontinuous portions, separated from the electrodes above by an insulating layer) "can also be applied to the liquid crystal display devices of the TFT active matrix type"

[col. 8, lines 20-26]. It would therefore be obvious to one of ordinary skill in the art to form the black matrix and insulating layer of *Yanagisawa* under the gate electrode structure of *Han*, motivated by *Yanagisawa's* teachings that the use of a black matrix prevents light from "leaking through the net-like area ... between the image elements" [col. 1, lines 14-23] so a black matrix is beneficial, and that the use of this particular black matrix (discontinuous, with various portions) reduces display defects which would otherwise be caused by short-circuits between the black matrix and the other electrodes [col. 2, lines 42-49].

The amended limitation "wherein the black matrix is wider than the gate lines and data lines" is not explicitly taught by either reference, since it compares two features, one from each reference. However, *Ishiguro* teaches that "a black matrix is provided to prevent light from leaking from the periphery of each pixel electrode ... [and] is typically formed with margins to ensure that no light leaks from the periphery of each pixel electrode" [col. 1, lines 31-35]. (Also note again *Yanagisawa's* teaching above regarding the use of a black matrix to prevent light leaking through "between image elements", in this case the pixel electrodes.) Thus, a purpose of the black matrix is to cover the gaps between the display electrodes in a passive matrix display (as shown in *Yanagisawa*), or the gaps between the pixel electrodes in an active matrix display (as in *Han*), to prevent light leakage and improve the display quality. As can be seen in *Han*, the width of the gate and data lines is less than the gaps between the pixel electrodes which are to be covered by the black matrix. It would therefore be obvious to one of ordinary skill in the art to have the black matrix wider than the gate lines and the data

lines, motivated by the desire to have the black matrix cover the pixel electrode periphery and ensure that no light leaks through, as taught by *Ishiguro*.

Claim 1 is therefore unpatentable, as is claim 15 which recites the method of forming the device of claim 1.

Han also discloses a pixel electrode [104] connected to the drain electrode, the contact made through a contact hole [116] in the passivation layer. Claims 2 and 16 are therefore also unpatentable.

Yanagisawa's black matrix [see Figs. 4, 6-9] is separated into a plurality of portions, so claims 3 and 17 are also unpatentable. Considering the arrangement of the black matrix in Fig. 7 applied to an active matrix device, there are first portions over gate lines, second portions over data lines, and these are separated from each other, so claim 5 is also unpatentable.

4. Claims 6 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Han* in view of *Yanagisawa* in view of *Ishiguro* as applied to claims 1-3, 5, and 15-17 above, and further in view of *Murade*, U.S. Patent No. 6,297,862.

The additional limitation is that the pixel electrode overlaps the black matrix. *Han* does not disclose a black matrix. *Yanagisawa* discloses a black matrix [see Figs. 6-9] which overlaps its transparent display electrodes (where the pixel electrode would be in an active matrix device), but does not explicitly disclose a pixel electrode or give a teaching explaining why it is beneficial to have the black matrix and the transparent display electrodes overlap as they are depicted doing.

Murade discloses an active matrix LCD with a pixel electrode [14] and a black matrix [7] on the substrate, separated from the other electrodes by an insulating layer [11], analogous to both *Yanagisawa* and the present invention. (The black matrix in *Murade* is also divided into portions.) *Murade* discloses that the black matrix overlaps the pixel electrode [col. 14, lines 66-67] and teaches that this arrangement dispenses with the need for precise alignment of a black matrix on the opposite substrate, and the thus obtained liquid crystal devices show little variation in light transmittance [col. 14, line 47 – col. 15, line 17]. It would therefore be obvious to one of ordinary skill in the art to overlap the pixel electrode and the black matrix, motivated by the example and teaching of *Murade*. Claims 6 and 19 are therefore unpatentable.

Allowable Subject Matter

5. Claims 4, 14, and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose or fairly suggest (in combination with the other claimed elements) the additional limitation of having buffer layers placed at the same plane as the gate lines or data lines, positioned between the neighboring separated portions of the black matrix. Claims 4 and 18 would therefore be allowable if rewritten appropriately.

The prior art also does not disclose or fairly suggest (in combination with the other claimed elements) the additional limitation of a common electrode on the second substrate having opening portions over the semiconductor pattern between the neighboring data lines, so claim 14 would be allowable if rewritten appropriately.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

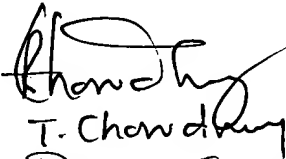
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (703) 306-5801. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (703) 305-3492. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

AS
Andrew Schechter
9 October 2003


T. Chowdhury
Primary Examiner